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ABSTRACT

Teletext broadcasting in the Japanese Language was begun in 1983 by the NHK (Japanese Broadcasting Corporation). It adopts the Pattern Transmission Method, since over 3,000 Chinese characters, in addition to the 46 Katakana and 46 Hiragana syllabaries, are necessary to write sentences in Japanese. Currently, the teletext programs consist of news, weather, information, and subtitles for drama serials. The deaf and the hard-of-hearing, whose estimated number in Japan is three million, are a target audience for teletext services. Three problems in delivering services for the deaf include: physical conditions for the display of characters on the television screen, the wording of subtitles to make them appropriate to the linguistic ability of hearing-impaired persons, and the effective expression of nonverbal information imparted by sound effects and music via subtitles. Plans for the future include transmission of more information, production of hard copy for viewers, and an increase in the variety of captioned programs. (Author/JB)

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Teletext and TV Programs
for
the Deaf and the Hard of Hearing in Japan

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I. Teletext Starts in Japan

Japan's first-ever teletext service was started in the Tokyo and Osaka regions on October 3, 1983 by NHK, the public broadcasting organization. It is a trial service, begun in preparation for the start of a regular teletext service several years later, whose main objectives are to investigate and examine various aspects of this new type of broadcasting service, such as, how the audience would react to the contents of the programs broadcast, how much would this teletext as one of the new technology of mass communication attract the interest of viewers, and whether the technical standards adopted would be appropriate or not. This trial teletext service, while providing useful data for future developments and planning of new services, proves a boon to this nation's 414,000 deaf persons and 3 million who are hard of hearing, because the new service will initially enable about one third of such people to enjoy some of the TV dramas broadcast by NHK on its nationwide network and also to receive news and information through television broadcasts.

In Japan, the study of teletext was started in 1972 by NHK Technical Research Laboratories. As compared with the studies conducted by Britain as the pioneer in teletext, Japan

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was by no means too late in starting its research in this new field of broadcast technology. The main reason why Japan had to wait until 1983 for the start of a teletext service despite its early start in research lay in the complexity of Japanese characters.

II. Outline of Japan's Teletext Transmission System

In transmitting textual and graphic data, there roughly are two systems; the Code Transmission method and the Pattern Transmission method. The Code Transmission method, which is widely used in Europe and America, is suited to the Western countries where the number of letters normally used—including the alphabet in both the capital and small letters, the numerals and various marks and symbols—is not more than 100 plus. Under the Code Transmission method, the television signal, into which the character code pulse trains are multiplexed, is received by a TV receiver equipped with a character generator, which decodes the message, and the texts appear on the TV screen. Diagrams also are displayed on the TV screen in the form of mosaic patterns.

However, unlike the Western countries which use only a hundred or so letters and symbols, Japan uses as many as over 3,000 Chinese characters in addition to 46 Katakana and 46 Hiragana syllabaries. So, until recently, it had been believed that, in actual practice, it would be next to impossible to make a TV receiver with a built-in character generator capable of handling such a large number of characters. That, in fact, is the main reason why Japan was obliged to develop on its own a special method other than the European-type Code Transmission method. As a result, because of its having been such a difficult task to carry out, it took such a long time for Japan to bring its teletext service into reality.

At first, Japan adopted the Pattern Transmission method because the Japanese characters are not only large in number but are also so extremely complicated in shape. Under the Pattern Transmission method, the teletext signals are trans-

mitted as dots. Since a page on a TV screen consists of 248×204 dots, this would mean that each character would be composed of 16×24 dots if the characters were to be displayed 15 horizontally and 8 vertically on the TV screen. Each page on a TV screen begins appearing from the top as the lines of dots emerge one after another from top downwards until a page is completed and displayed on the screen in 2.7 seconds. Since, in the Pattern Transmission method, the graphic pictures too are expressed on the TV screen by dots, the pictures obtained on the screen by this method are much more vivid than the mosaic-form pictures displayed by the Code Transmission method.

In starting its teletext in October 1983, NHK was authorized by the Ministry of Posts and Telecommunications to conduct the service under the Pattern Transmission method. Meanwhile, however, as a result of the recent rapid development of the IC memory device and the subsequent reduction in its price, it has become quite possible to manufacture at an appropriate price a teletex decoder with a built-in character generator capable of producing the over 3,000 Chinese characters. Hence, in Japan, research and developments are currently being carried on for teletext using what is called the Hybrid Transmission method, a new type of Code Transmission method incorporating the advantages of the Pattern Transmission method. Teletext services under this Hybrid Transmission method is scheduled to be started in Japan, once the technical standards for this method will have been fixed, probably in 2~3 years' time. Then, it is expected that a number of commercial broadcasting stations will be commencing their teletext services.

The technology of Japan's teletext is neither of the British nor of the Antiope or the Telidon system. It is a 'photographic coding system', a 4th system that Japan has developed entirely on its own.

III. Contents of the Teletext

The teletext service started by NHK as from October 1983

consists of items as shown in the following table:

Table 1 Program Schedule of Teletext

Program Nos.	Item	Broadcast Hour	No. of pages	Frequency of renewal
1	Contents	Same as that of NHK's General TV service	1	1/day
2	News headlines	12:00~22:00	1	2/day
3	News	12:00~22:00	8	2/day
4	Local news	12:00~22:00	4* (2×2)	2/day
5	Weather forecast	12:00~22:00	2 (1×2*)	2/day
6	Notice about matters relating to deaf and the hard-of-hearing persons	Same as that of General TV service	3	2/week
7	Synopsis of "O-Shin", a TV drama serial	"	3	1/day
8	Subtitled program of "O-Shin"	8:15- 8:30 12:45-13:00	75	1/day

*For two regions; Kanto (east) and Kansai (west)

The news and notices are displayed on the TV screen in 15 letters, 8 rows of sentences, while the weather forecasts are shown with the pictures of the sun, the cloud and the umbrellas placed over a map formed with dots. Eight colors can be used and the flashing of words and symbols can be done.

The "O-Shin" mentioned in the item No.8 of the Table 1 above is the title of a TV drama serial about a life story of a Japanese woman named O-Shin who was born in a poor farm village and who, after going through a great deal of hardships, eventually becomes a proprietress of a big supermarket chain. Televised every morning from Monday through Saturday, this 15-minute TV serial is scheduled to run for one year from April 1983 until March 1984. This drama serial has proved so extremely popular all over Japan that each program now exceeds 60 percent in audience rating, which means that each

program in this serial is viewed every morning by more than 60 million people throughout the country. The weekly total of the telecast hours of the "O-Shin" with captions would be 3 hours, since each 15-minute program is repeated at mid-noon every day.

The deaf persons all over the country are following this TV drama serial with equally keen interest. When the writer and his colleagues made a survey on the deaf persons in various parts of the country about their interest in TV programs, many of the deaf women at home were found to be enjoying this particular program every day in various ways, such as, with the help of other members of the family using sign language, or buying and reading a weekly magazine which gives the synopsis of "O-Shin" to be broadcast during the week before viewing the program each morning.

The 'synopsis of "O-Shin"' mentioned in the Table above under the item No.7 is written out in two pages, displayed on the TV screen, to give the outline of the story to be broadcast on the particular day. This synopsis is broadcast in the hope that the deaf people with inadequate language ability would be helped in understanding the content of the program better if they viewed the program after having read this teletext synopsis in advance.

As you will have seen from the Table above and from what have been explained in the foregoing passages, the main feature of the trial broadcasts of the teletext service is that the entire service is intended primarily for the deaf and the hard-of-hearing. In the programming of news and weather forecasts, too, those people are considered as the main viewers of the teletext. After viewing a captioned program of "O-Shin", a representative of an organization of hearing-impaired people made the following comment: "The hearing-impaired people, like us, are virtually denied the great variety of information that hearing people have access to, since we seldom have a chance of engaging ourselves in daily conversations, nor can we hear the voices or sounds coming out of TV or radio. But now, with captions added to a TV drama, we are able to understand some of the conversations exchanged among the hearing people, the conversations

which used to be something inaccessible for us deaf people. The teletext news, through which we can inform ourselves of what are happening in Japan and the world, will no doubt enrich the sentiments and knowledge of the hearing-impaired people and widen their range of view."

The teletext service under the Pattern Transmission method, as shown in the Table 1 above, is capable of providing only 22 pages of seven items and one captioned TV drama. Such smallness of amount of information conveyed is, indeed, a major shortcoming of the Pattern Transmission method. But under the Hybrid Transmission method which is to be available several years from now, the volume of information that can be transmitted will be increased at least by ten times and, as a result, when that time comes, the content of the pages to be transmitted will become much more diversified and many more TV programs will come to be broadcast with captions.

Prior to the start of the teletext service by NHK, several different types of teletext-decoders were put on sale by electronic-equipment manufacturers. Among such receivers, there is a 21-inch TV set which has a built-in printer that prints out the words and pictures of the teletext broadcasts received. The price of this TV receiver is 350,000 yen. There also is an decoder, priced at 110,000 yen, to be attached to an ordinary TV set for the decoding of the teletext signals received.

Since the trial teletext service was started only recently, there is no figure available yet to show how far the teletext receivers have found their way into the homes of the deaf people. But in view of the donation of 123 sets of teletext receivers made in October 1938 to the clubs for the deaf people as well as to the schools for the deaf by donores such as the Electronic Industries Association of Japan, it is anticipated that the utilization of teletext will start with group viewing of the programs done at such institutions provided with a teletext receiver and will gradually spread to individual viewing at the homes of the deaf people along with the spreading of teletext receivers.

We, at NHK Radio and TV Culture Research Institute, are currently conducting a survey on the deaf people in such institutions mentioned above to find out the opinions they may

have formed after viewing the teletext news and notices as well as the captioned TV drama programs—what their judgments are about the content of each program, the length of each caption and the speed at which each caption appears on and disappear from the TV screen, whether or not the texts of the captions are too hard for them to understand, and so on. The results of the 1st survey are to be published by the end of 1984 at the latest.

IV. Television for the Deaf —TV by sign language—

It was in April 1977 that a TV program specifically designed for the deaf was broadcast for the first time in Japan. Entitled "For the Deaf", the 15-minute TV program produced by NHK was broadcast on its nationwide Educational TV network. This program, which has since been extended to 20 minutes in duration, is broadcast every Sunday evening on NHK's nationwide network, serving as a valuable channel through which the deaf people can receive information on a regular basis.

This program, as a means of conveying verbal information, is based on the concept of what is known as the 'Total Communication Method', in which language is conveyed through several different channels, viz., Sign, Finger Spelling, Lip Reading, Captioning and Spoken Language. Among these, Sign plays the major part as a channel through which to convey information, but there are a number of problems in using signs in TV programs which are broadcast on a nationwide network.

One of the problems is that there are some differences in the sign languages used in various regions in Japan. And secondly, there are roughly three types of sign languages in this country each of which is used in various ways by deaf people of different generations: the traditional "Japan Sign Language" which has a grammar different from the Japanese language and which had emerged spontaneously from among the deaf people's society in this country; the "Signed Japanese" in which the Japanese language is expressed by means of hand signs; and the intermediate-type sign languages that may be

positioned in between the first two types. Since no standard sign language has as yet been fixed in Japan, there always has been a problem as to which type of sign language should be used in nationwide TV broadcasts.

With regard to this problem of which sign language to use in TV efforts have been made to solve the problem by what is called the 'think as you run' method and the broadcasts intended for reception by the deaf people have been carried on until now by a presentation method in which skilled sign-language interpreters appeared as regular TV presenters using the intermediate-type sign language. As had been anticipated by the broadcasters, pros and cons were expressed by the deaf viewers throughout the country about the sign language used by the presenters in the TV program. Over a period from 1977 to 1981 the researchers of NHK Radio & TV Culture Research Institute, using the videotape recordings of the sign-language TV programs and test programs, conducted a series of surveys concerning the sign languages used in TV at nine locations throughout the country on about 600 deaf persons. On the basis of the data obtained from this sign-language communication survey which was carried out over such a long period and on such a large number of deaf persons as mentioned above, improvements were made on the signs and finger-spelling used by the TV presenters, with the result that this series of TV programs have gradually come to be given high evaluation by the deaf society.

In Europe and America, too, there are many broadcasting stations that televise programs for the deaf using a sign language. In such TV programs, there are two different ways for the sign-language interpreter to be shown on the TV screen. One, like the "See Hear!" of the BBC of Britain, is the presentation method in which the sign-language interpreter appears on the screen as one of the performers in the studio and the other, like "C'est la Vie" of the Antenna 2 of France, is the method in which the interpreter appears in the elliptical frame cut in the corner of the TV screen. About such an aspect of presentation method, too, we asked the deaf people to give us their opinions from their point of view and found out that they welcomed

most the method of having the sign-language interpreter appear in the center of the TV screen. This opinion of the deaf viewers was immediately conveyed to the production team in charge of the programs "For the Deaf".

It is seven years now since the broadcasting of a TV program using the sign-language as the major means of communication was started by NHK. Needless to say, the foremost achievement made by this TV program is that it has enabled the deaf people to obtain quickly the various pieces of information they need for their daily lives as well as the news of the world. This, of course, is not all. The writer believes that the TV program for the deaf has produced various outstanding results as follows and that such results, all combined, have contributed to the improvement of the deaf people's lives and to the enhancement of their social positions.

First, as a result of the sign-language as the deaf people's 'mother tongue' having been televised over the nationwide network of NHK which is the nation's only public broadcasting organization and the largest of all the broadcasters in this country, the deaf people as the users of such a language were not only able to see their own social positions elevated but were also given the sense of psychological stability and the consciousness of independence. In the past, when the deaf people used the sign-language in public to communicate with one another, they were sometimes looked at with contemptuous eyes. But since the people began seeing the TV program using sign-language, the prejudice against the sign language gradually disappeared and, moreover, the number of the hearing persons learning sign-language increased sharply. In fact, this TV program for the deaf is also playing a part as the audio-visual-educational aids for such hearing people in their study of sign language.

Second, the TV program has played an important role in the standardization of the sign language and in the spreading of a common sign-language. In Japan, the education of the deaf does not use sign-language but adopts the oral method. As a result, it is extremely difficult to spread a common sign language among the deaf people all over Japan. It was in such circumstances that NHK's TV program series was broadcast

with some of the best sign-language interpreters in Japan possessing an excellent technique of communicating in sign language, making use of the results of our studies and taking an active part in conveying the content of the program in excellent sign-language and in an easy-to-understand manner. The sign language used in the TV program proved so clear and effective that it gradually came to be regarded as a kind of "criterion" and began spreading rapidly among the deaf and the sign-language interpreters throughout the country.

The sign language has only about 3,000 words, which is not quite enough to convey the contents of TV programs with various contents. Hence, the deaf people and the sign-language specialists have been cooperating with one another to create additional sign words. And in spreading such newly-created sign words, too, television has proved extremely helpful. That, indeed, is the third achievement made by the TV programming for the deaf. In the 1920s, the radio played a major role in spreading the standard spoken Japanese and also in promoting the education of the Japanese language in general. Today, the television programming using sign-language is playing a similar role in the standardization and spreading of sign language.

During the last seven years, in the production of the TV programs for the deaf, five parties have been cooperating closely; the organizations of the deaf people, specialists on the deafness, the sign-language interpreters, the TV program directors and us, the TV program researchers. The five parties have carried on their work of developing and improving the TV programs for the deaf, occasionally sitting around the same table to discuss questions facing them. Such collaboration among the five parties has been most useful in improving and enriching the content of this series of TV programs. This system of collaboration has since been adopted as it was in carrying on the production and studies of teletext for the deaf and thus in 1978 we began our studies of the captions for the deaf viewers of the TV programs.

V. Teletext Service for the Deaf : Three Problems to Be Solved

Since NHK's TV program "For the Deaf" adopts the idea of the Total Communication method as mentioned above, it is broadcast not only with sign language but also with captions. So, even at the end of the 1970s when the start of the teletext service was considered as something far away off in the future, NHK was already producing videotaped programs for use in conducting tests of open captioning using the conventional-type character-insertion equipment and was making a monitor-survey to find out how such captioned programs were received by the hearing-impaired.

As the first step, we added captions to a few videotaped programs and took them to some of the deaf clubs to have them view the programs and comment on them. As a result, we found that the problems which required our study and examination could be divided into three categories.

The problems in the first category were those related to the physical conditions for the displaying of the characters on the TV screen, such as, the size of each character, the number of characters per line, the length of time a sentence should be left on display and the position of the characters to be displayed on the screen. After it became possible to test-produce a captioned program by using the teletext-technology system, programs for experimental use were produced for the purpose of seeking the opinions of the hearing-impaired people about the color of characters and the method of 'flashing' of characters as well.

The problems in the second category were those relating to the need of devising the wordings of captions that conform with the linguistic ability of the deaf. In the case of a teletext service intended solely for the post-lingually deafened people, there would be little problem if the captions were made on the assumption that the viewers' linguistic ability would be the same as that of the hearing people. However, if the program were

were intended to be viewed also by the people who were either born deaf or deafened pre-lingually, it would then become necessary to ensure that the Japanese captions accompanying the program can be understood easily by those people, too.

The problems in the third category were those concerning how the non-verbal information such as sound and music could be expressed in the captions. In the case of television, which comprises pictures and sounds, one may say that one has enjoyed a TV program only after having received both the pictures and the sounds; that is, having seen the former with one's eyes and heard the latter with one's ears. In fact, the idea of the teletext service is to have the hearing-impaired people enjoy the sounds as well as the pictures by converting the sounds into something that is visible. Among the various "sounds", there are, besides the spoken language, many kinds which may roughly be classified into two; the so-called 'sound effects' such as the sound of the wind or that of the telephone bell, and the so-called 'background music' or the 'effects music'. Those non-language sounds will have to be made visible — to turn them into captions.

1) *Physical Conditions for Character Display*

In the teletext service using the Japanese language, only a total of 120 characters comprising 8 lines of 15 characters can be displayed at a time on the TV screen because of the inclusion of complicated characters called Kanji (Chinese characters) in the texts to be displayed on the screen. In the case of the captions, the maximum number of characters that can be displayed at a time is only 30 because each caption is to consist of only two lines. Indeed, the volume of information conveyed by 30 Japanese characters and that conveyed by the same number of Roman letters are not equal, since the Chinese characters are ideographs. Yet, it is undeniable that, compared with the Ceefax of Britain which offers captions each with 3 lines of 40 characters, our teletext using the Japanese language evidently is at a disadvantage in terms of the volume of information conveyed by each caption. It was with such restriction on the number of characters on mind that we carried on our research about the wording of captions that would be the easiest for the

hearing-impaired viewers to read within the short period each caption remains displayed on the screen.

Since the Japanese language has the characteristic in that it can be written either horizontally or vertically, we have tried to find out the best way of displaying the captions on the TV screen by test-making them in various ways; writing vertically and displaying it on the right-hand side of the screen, writing vertically and displaying it in two sections on both sides of the screen at the same time, or writing the caption horizontally and displaying it on either the top or the bottom of the screen. Since the majority of the opinions given by the hearing-impaired people favored the caption displayed horizontally at the bottom of the screen as being the easiest to read, a decision was made that this position at the bottom of the screen should be the basic position at which the horizontally-written captions should be displayed.

As to the optimum length of time a caption should be displayed on the screen, studies have been made through various types of paper tests and questionnaire surveys as well as experiments using a program-analyzer which, by having the deaf people press the on-off keys, accumulates the reactions of individual persons. As to how fast a hearing-impaired person can finish reading a sentence, a series of experiments was conducted using an eye-camera which clarified how the viewers' eyes followed the characters in the captions displayed on the screen.

The use of bigger characters in expressing shouts; the coloring of the words the speaker emphasized in red or cyan; or the making of musical notes and telephone-bell symbols flash.....those devices we had made were favorably received by the hearing-impaired of captioned programs.

One of the main points to be noted about the position of a caption on the screen is that the caption should not be positioned in such a way as to cover the lips of the speaker. A hearing-impaired viewer focuses his or her eyes on the movement of the speaker's lips with such an intensity as to be beyond the imagination of hearing people (this has been reaffirmed clearly by the experiments made with an eye-camera). That is why many of

the hearing-impaired persons on whom our tests were conducted have told us that, when the speaker's lips were covered up by a caption, they felt a terrible feeling of irritation in much the same way, they said, as a hearing person would experience when he had to listen to the "radio with a lot of noises". Those things as mentioned above were brought to light one by one as we repeated the process of producing a test-program, holding a screening session for viewing by a hearing-impaired audience, revising the program in compliance with the comments given at the viewing session and again having the revised program viewed by a hearing-impaired audience. It was only after having repeated such a process as mentioned above that we realized that the condition of being a deaf, which had seemed to be similar to the condition a hearing person would find himself in by cupping both his ears with his hands, was in reality entirely different.

2) *Linguistic Ability of Hearing-impaired Persons and Caption-wordings Suited to Such Ability*

If we were to consider that major audience of teletext consists of people who have been deaf since before their early childhood, we would realize that, in the writing of captions too, we must try to be very careful in ensuring that the texts of captions are written in such a way that they can be understood readily by such an audience. This is because there is a theorem in linguistic-psychology which says that a human being would be greatly obstructed in his learning the language if no spoken word came into his ears during his early childhood from 1 to 5 years old. Hence, among the grown-up deaf people, there are not a small number of persons who can read the texts only up to the level of primary school children.

Japan's education of the deaf has a history of about 100 years. During these 100 years, studies on the linguistic ability of deaf children have been conducted from various angles and the results of such studies have been accumulated to a considerable extent. The data and material resulting from such studies have been of some help to us in thinking up the basic concept of the method of writing TV captions. However, for the following

two reasons, the results of studies made on the linguistic ability of the deaf children achieved through the education for the deaf failed to provide us with any data that would be of direct use to us in our writing of the captions for teletext. First, our teletext service is intended for the grown-ups. And with regard to those grown-ups, we anticipated that their linguistic ability would be considerably lower than the younger deaf people because the grown-up deaf people of today are those who spent their childhood years in those times when the ratio of attendance at the schools for the deaf was still low and the teaching method for the education of deaf children was not as advanced as it is today. But, unfortunately, no study had as yet been made to clarify this point. Second, reading a text written on a sheet of paper and reading a caption which is displayed on the TV screen only for several seconds are entirely different from each other. Moreover, there are the restrictions in the wording of sentences, such as, that each caption must be written within the range of 30 characters consisting of two lines of 15 characters written horizontally, after cutting up long sentences into small groups of words to fit into the space allowed for each caption. And, naturally, no study had as yet been made on the reading of such captions displayed on the screen only for a brief period.

So, what we, the teletext researchers, did was to produce a test-videotape and, using this tape, to repeatedly conduct linguistic-understanding tests on the grown-up hearing-impaired persons. As a result, we discovered many points which required special attention when we consider the question of writing captions for teletext.

I would rather not go into any further details on this question, since it would not be appropriate to elaborate, in this English thesis, on the specific wording of Japanese captions for teletext service in Japan. In this connection, however, I would like to add that we did find many cases which were common in nature to what we had read in the manual made by the WGBH station of the U.S. about the production of captions for the programs for the hearing-impaired audience. The manual said, among other things, that such functional words as "as", "so" or "but", as well as the expressions given in conversation

style, were difficult for the deaf audience to understand and we found that this applied to the Japanese, a language completely different from English, as well.

In the course of the series of tests we conducted on the hearing-impaired audience with captioned videotaped programs, we encountered some opinions which seemed to us to be extremely important in carrying on our studies of this question of captioning. Those were the opinions given by some of the hearing-impaired who insisted that the speeches and narrations contained in the original TV program should be made into captions in their entirety, regardless of whether or not the linguistic ability of the hearing-impaired audience would be enough for them to read and understand those captions. What those people contend is that it would mean a discrimination against the hearing-impaired people if the spoken words contained in the original program were to be simplified at the sole discretion of the caption-maker, thus denying the hearing-impaired audience access to the entire text of the words spoken in the program. There also were good many hearing-impaired persons who said that they felt as having been insulted when they noticed that no caption was given even if someone on the TV screen was apparently uttering some words, or when they found that there was a slight difference between the content of the spoken words they understood by lipreading and that of the caption displayed.

In the autumn of 1981, an international conference was held in Linz, Austria, about television for the hearing-impaired audience. According to Mr. M. Cooper, the BBC editor of Ceefax who gave an address at this conference, the Ceefax took the same stand as the one taken by the abovementioned hearing-impaired people who insisted on including the entire spoken words of the program in the captions. Mr. Cooper said that, in the case of Ceefax, no abridgement was done of the words spoken in the original program and that verbal content of the program was made into captions almost in its entirety. This position taken by the BBC is most suggestive.

On the other hand, the fact remains that, in order for the hearing-impaired audience to enjoy a TV program in a relaxed

atmosphere, the texts of captions should preferably be as less crowded as possible and should be as easy to understand as possible for the deaf. There are many hearing-impaired people who express their wish to fully enjoy to see the characters, as well as captions, on the TV screen. In fact, in Japan, such people formed the majority of the hearing-impaired audience of captioned TV programs.

In an effort to arrive at a conclusion about the volume of captions, or as to which of the two positions mentioned above should be taken, we conducted a series of meetings to examine the subject together with the educators of the deaf and the leaders of organizations of the deaf. As a result, a conclusion has been reached that it is not possible to establish common standards applicable to all types of TV programs and that different standards should be set for each type of program in preparing captions for the hearing-impaired audience. Thus, in the case of "O-Shin," the TV serial for which the captioning was started from this October, it was decided that it should be captioned with abridged texts about one-half the volume of those of the original program so that the hearing-impaired, especially the middle-aged and older people, may be able to enjoy the drama serial in a relaxed atmosphere. This is not to be considered as any sort of fixed standards, as it leaves a room for us to be flexible in making necessary changes in accordance with the opinions to be given us by the hearing-impaired viewers after their having seen this TV series for a period of time.

One of the major advantages of the news and notices broadcast on a teletext service is that the hearing-impaired can keep each page on the TV screen as long as they like. In the TV program, "For the Deaf", which is broadcast on our regular TV network, a 5-minute news in text is broadcast but each page is switched to the next after it is left on the screen for a certain period of time. In the case of the teletext service, however, each page is left displayed on the TV screen until the hearing-impaired viewer flips a switch on the keyboard.

3) *Symbolic Expressions Unique to Teletext Broadcasting of Sound Effects, Music, etc.*

The sound effects that are necessary for the viewer to understand the story of the drama, such as the sound of the telephone bell, the sound of storm, or the siren of a police patrol car, are shown on the TV screen as symbols or words (e.g. "ring ring") or sentences ("The phone is ringing"). The background music and music to express certain kinds of feelings are sometimes expressed on the screen in various ways, such as, showing musical notes on the upper corner of the screen or displaying the title of the music played or its words.

There are a number of methods to convert sound effects or music into a visible form. Any method may be adopted but the most important thing for the hearing-impaired is that none of such sounds is ignored but all of them are expressed in a visual form. For example, in the drama we were captioning, there was a sequence of about one minute long during which no spoken word was to be heard. It was a series of scenes in which a train approached from a distance and, as the warning-bell at the crossing kept clanging, the roaring sound of the train grew louder and louder. What we did in this case to express the sounds in a visual form was to use characters of different sizes or shapes so as to express the varying intensity of the sounds. Having seen this program, one of the hearing-impaired viewers said, "For the first time in my life, I knew that a railway crossing was issuing sounds. It seems to me that I'm gradually getting to know the 'world with sounds'".

With regard to the three points mentioned above, what is of basic importance is the reaffirmation of a matter of course; that the teletext service is intended primarily for the hearing-impaired, that is, the people who cannot hear. This leads us to the following two questions as the points to which special attention must be paid.

First, we must translate into visual form everything coming out of the soundtrack of a TV program, in such a way that the hearing-impaired audience can 'see' and understand, because all such sounds are necessary for the hearing-impaired viewers in

understanding the TV program as well as the hearing people do. Such sounds are not confined to the above-mentioned speeches, telephone bells or background music. In fact, in TV dramas and nonfiction programs, there are many scenes that are extremely difficult to give captions, such as, the buzzing sound coming from a crowd of people, the fading sound of waves crossing with the background music, the voice of a person talking at the other end of the telephone line, or a scene in which a person is saying something but his voice is not reproduced and, instead, music depicting that person's mental state is heard in the background. As long as those elements are indispensable in understanding the TV program, the providing of captions will be equally indispensable.

The bringing up of the second question evidently runs counter to the solution of the first problem. Whereas a hearing person takes in two different types of information at the same time through the eyes and the ears as the two organs by which to receive information from outside, a hearing-impaired person watching a teletext program is required to 'read' the two types of information simultaneously with his eyes as the single organ through which to receive information. As a result, if the captions were produced with an excessive zeal to be faithful to the sounds and voices contained in the original program, it more often than not may turn out that the hearing-impaired viewer, his time taken up by the captions which he must read within a limited time, has hardly any time to watch the pictures which are of major importance in following the story. Hence, it is all the more important for the producers of captions to devise the wording in as much summarized a form as possible, eliminating those portions that are not essential to the understanding of the program, so that the hearing-impaired may be able to have ample time to watch the pictures and read the captions at the same time.

In order to carry out the work of putting the captions with a maximum of 30 characters into the memory of a floppy disk while giving due consideration to the above-mentioned two points which are obviously mutually contradictory, it is most essential that those of us who are in charge of this work must

not only possess a deep insight into the psychology and lives of the deaf but also a creative power in true sense of the word; that is, to be able to grasp the content of the TV program in its entirety and to express it with a limited number of symbols.

Since the kind of work as described above requires experts who possess special skills, a company called NHK Broadcast Information Service Co. Ltd. was established in August 1983 so that this new company, while conducting the training of specialists, may handle the work of captioning for the teletext programs.

VI. Teletext and Hearing-impaired People in Japan: Prospects and Plans for the Future

Japan's first-ever teletext service which was started in October 1983, because of its being conducted under the Pattern Transmission system, has the shortcoming of its being capable of conveying only a limited volume of information. It is most likely that, in two or three years, the Code Transmission system using new technologies will be put to a start. Once this new system is adopted, it will become feasible to convey some 80 items of information on a single line and also to add a simple kind of music. And several years after that, transmissions of information amounting to some 600 items in 1,000 pages will become feasible, because by that time it will have become possible for us to use 8 lines per channel for the teletext service. And by having the receiving equipment produce printed copies of the teletext received with a built-in printer, the owner of such a TV receiver would be able to keep the printed copies of the teletext news just the same way as he subscribes to a newspaper. When such a time comes, the number of captioned programs would surely have increased and the hearing-impaired people would be enjoying much more captioned programs of a greater variety including the dramas, nonfiction programs, educational programs and children's programs.

One of the major shortcomings in the techniques of captioned programs is that it takes such a great deal of time to caption a

program. For example, the captioning of a 15-minute drama takes about 15 hours. And there is little hope in reducing this work hour in the future even with the improved skills of the personnel in charge, as long as the captioning work is done manually by flipping the switches on the computer keyboard. To cope with this situation, NHK's Technical Research Laboratories have been conducting studies on a method by which the sounds may be input into the computer to be converted into Japanese characters which will be instantly displayed on the screen as captions.

The greatest benefit that the deaf and the hard-of-hearing people receive as a result of the start of the teletext service is, of course, that those people can now enjoy the TV dramas, learn news as they break and obtain at any time the kinds of information that a hearing-impaired person needs. However, in my view, there is another, even greater, advantage that can be derived from the teletext service. It is that the hearing-impaired people can now watch the same TV programs that are watched by the hearing people including the other members of their families as well as their friends, enjoying the programs or being moved by the stories together, and to share the experiences and sentiments with the general hearing people. In 1981, the International Year of the Disabled Persons as designated by the United Nations, we had two slogans, viz., "Participation" and "Equality". One of the main significances of this International Year of the Disabled Persons was that it projected the ideal state of life where the handicapped and the non-handicapped people take part in various activities on an equal footing and share the happiness in life instead of living separately in different worlds and obtaining information from different sources.

A young hearing-impaired woman says: "Before the start of the teletext service, I used to sit with my sister to watch TV dramas the outline of which my sister would explain to me by sign language. One day, when we were once watching a TV drama, we came to a scene where my sister burst into laughter. When I asked her what made her laugh so much, she told me to wait a minute and said that she would 'explain after the

drama is finished'. I naturally couldn't say anything further to her. But after the teletext began, I no longer had to trouble my sister with such questions. I'm glad that, from now on, I'd be able to laugh at a scene on the TV at the same time my sister laughs. And what's even better, I can learn new words from the captions. The day I first watched the teletext was, indeed, the happiest day in my life."